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Boxwood Blight: New Disease Is On the Move

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The new boxwood blight, caused by the fungus *Calonectria pseudonaviculata* (also known as *Cylindrocladium buxicola* or *C. pseudonaviculata*) has encroached on some New York gardens over the past year. It was first detected in the state in December of 2012, from samples in Westchester, Nassau and Suffolk counties. These diseased boxwood were discovered at retail businesses by NYS horticultural inspectors; in all cases, the proprietors worked hard to eradicate the disease from their premises. In January 2012, the disease was detected on a single private property in Suffolk County by a landscaper. After these early cases, the nursery and landscape industries were braced for an explosion of the problem in the 2012 growing season, but spring and early summer passed without new cases being brought to the attention of the diagnostic laboratories in Ithaca or Riverhead.

Symptoms of boxwood blight © M. Daughtrey

In early September, however, a very humid weather period appeared to spark a cluster of detections of boxwood blight in landscapes in southeastern New York. The optimum conditions for rapid disease development are found during spells of wet, humid weather when temperatures range between 64 and 77°F. The longer the leaf wetness period, the more leaves will be blighted. From September thru November, 2012, there were a number of findings of the new disease in Suffolk, Nassau and Westchester counties, and similar activity was noted in Connecticut. Recently installed boxwood were generally the culprits for initiating the disease outbreaks. The symptoms were dramatic and attention-grabbing in these cases: the affected plants showed areas of brown, blighted foliage, and close inspection revealed dark round leaf spots, approximately ¼-inch across, either brown or black. Short black cankers about ½-inch long were also seen on the green shoots. With time, the affected leaves dropped from the plants, leaving many defoliated shoots on the top or sides of specimen shrubs or hedges.

Boxwood blight symptoms in container-grown plant © M. Daughtrey

Recently installed boxwood were generally the culprits for initiating the disease outbreaks.

Established planting of boxwood with symptoms of boxwood blight © T. Marino

Initial symptoms appear as dark or light brown spots on the leaves © M. Daughtrey

Leaf spots on boxwood with boxwood blight © M. Daughtrey

Pachysandra infected with C. pseudonaviculata show small tan leaf spots with yellow haloes as well as short brown shoot cankers © J. LaMondia.

Response to the disease

The landscape gardeners faced with these situations responded promptly, removing small plants of lesser value, pruning out the affected portions of valuable specimens, and vacuuming up all of the fallen leaves. (Leaf removal is essential because the pathogen forms microsclerotia in the killed leaves, allowing the pathogen to remain viable during summer heat or winter cold for years). Follow-up treatments with chlorothalonil were sometimes made to protect other boxwood near the affected specimens. Studies in Europe and North Carolina have all indicated effectiveness of protective chlorothalonil applications. No truly curative treatments have been identified, but fungicides in the strobilurin, benzimidazole, and DMI (demethylation inhibitor) categories have all shown some benefit as protectants against the boxwood blight pathogen in research trials. Additional studies are underway to improve our understanding of when to treat and how to design effective rotations of fungicides with different modes of action. Read fungicide labels carefully to determine whether products are registered for use on boxwood against a foliar *Cylindrocladium* disease.

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Additional hosts

Research by Jim LaMondia at the Connecticut Agricultural Experiment Station has indicated that the common Japanese spurge, *Pachysandra terminalis*, is a host for the fungus causing the new boxwood disease. Symptoms on pachysandra are already being seen in real-life landscape situations here in the US. Pachysandra infected with *C. pseudonaviculata* show small tan leaf spots with yellow haloes as well as short brown shoot cankers; the characteristic spores develop on the leaves after they drop from the plant. A second pachysandra species, the native Allegheny spurge, *P. procumbens*, has also been found susceptible in inoculation trials by LaMondia. The new boxwood blight pathogen has only been observed on pachysandra growing near infected boxwood in landscapes; pachysandra in wholesale or retail nurseries has not been found to be contaminated. Experimental inoculations in the UK have shown that *Sarcococca,* another member of the Buxaceae, is also a host of this same disease.

Common Japanese spurge, *Pachysandra terminalis*, is a host for the fungus causing the new boxwood disease.

Susceptibility varies

Because this new disease was so recently discovered in the United States, we do not have the advantage of years of research under environmental conditions typical of our cultivars and our growing conditions. Studies in Belgium, the UK and Germany have provided us with a lot of useful information that helps us to make educated guesses that will help boxwood growers. Research in the US began in 2012. A cultivar comparison trial at NC State University by Ganci, Benson and Ivors showed a wide variation in the relative susceptibility of different cultivars of boxwood—similar to what has been seen in European trials in the past. English boxwood (*Buxus sempervirens* 'Suffruticosa') is invariably highly vulnerable in any of the trials to date, and common boxwood (*B. sempervirens*) is also very prone to the disease. Others which frequently show extremely high levels of infection include *B. microphylla* 'Morris Midget' and *B. sinica* var. *insularis* 'Justin Brouwers' (which has recently been shown to be a *B. sempervirens*). In the 2012 North Carolina trial, some boxwood tested as "moderately tolerant" (*B. microphylla* 'John Baldwin' and 'Winter Gem'; *Buxus* 'Green Gem'; and *B. sempervirens* 'Fastigiata' and 'Dee Runk'). Only slight traces or no infection was seen in *B. microphylla* 'Golden Dream', *B. harlandii*, *B. sinica* var. *insularis* 'Nana' and *B. microphylla* var. *japonica* 'Green Beauty', under conditions in which 50% of the English boxwood foliage was blighted. Given several more seasons for experimentation, US researchers should be able to supply growers with a listing of cultivars in the trade that have less susceptibility to the disease than the English and American boxwood. It is hoped that plant material in the collection of the US National Arboretum will be used to develop superior boxwood that may be grown successfully even in the presence of inoculum of the new boxwood blight pathogen.

Alternatives to boxwood

While we wait for further guidance on which boxwood cultivars will resist this new fungal pathogen, alternative plants have been proposed for use in the Northeast. The appropriateness of a substitute may depend upon whether deer browse is a factor: resistance to deer is one of the chief attributes of boxwood. Vinnie Simeone, Director of the Planting Fields Arboretum, has suggested a number of plants similar to boxwood in both foliage and habit, including *Ilex crenata convexa*, *I. crenata* 'Soft Touch', *I. crenata* 'Steeds', *I. crenata* 'Helleri', *I. glabra* 'Compacta', *Lonicera nitida* or *L. pileata*, *Euonymus japonicus* 'Green Spire', and *Teucrium*.

Sanitation practices are critical

Although this disease has been seen to move rapidly and destructively through plantings under warm, wet, humid environmental conditions, it is hoped that the large, sticky spores of the fungus will not be found to move long distances by wind. Within-property spread by wind-driven rain or on shears is easily imaginable. Any companies that shear boxwood should use utmost care in sanitizing equipment between properties. Quick dips in disinfectant are not enough: remove accumulated sap and organic matter from shears with paper towels and dip them in disinfectant for ten minutes between properties to avoid spreading the disease. Take special care when pruning boxwood that are known to be infected.

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New plantings

For new boxwood plantings, consider growing cultivars that appear to be less susceptible to the disease. Locate new boxwood plantings in non-shaded sites where boxwood can be irrigated at the soil level, rather than from overhead.

For More Information and Illustrations

Virginia Cooperative Extension Fact Sheet:
pubs.ext.vt.edu/PPWS/PPWS-4/PPWS-4.html

The Connecticut Agricultural Experiment Station Boxwood Blight information page:
www.ct.gov/caes/cwp/view.asp?a=3756&q=500388

North Carolina State University information and research trial results:
plantpathology.ces.ncsu.edu/pp-ornamentals/

Fact sheets on boxwood blight, from Suffolk County Long Island CCE (Scroll to Diseases and Pests of Ornamental Plants)
ccesuffolk.org/agriculture/commercial-horticulture